SUMP DEPRESSURIZATION AND VENTING REPORT

FORMER MANUFACTURING PLANT BUILDING
2, 4 FOSTER AVENUE AND 3 UNITED STATES AVENUE
GIBBSBORO, NEW JERSEY

July 2016

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565479

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1 INTRODUCTION

1.1 PROGRAM OVERVIEW

As part of the ongoing investigation at the Former Manufacturing Plant (FMP), the U.S. Environmental Protection Agency (EPA) and The Sherwin-Williams Company (Sherwin-Williams) identified elevated levels of methane and volatile organic compounds (VOCs) in the subsurface environment at various locations on the FMP property. Sherwin-Williams installed an automated telemetric system to perform continuous monitoring of floor sumps and indoor air in 2 and 4 Foster Avenue and 3 United States Avenue. These buildings are owned by Brandywine Realty Trust (Brandywine) (owner) and are occupied by Harbor Linen (tenant).

The *Sump Depressurization and Venting Work Plan* (Work Plan) was implemented between June 9 and June 13, 2016, and addressed the passive ventilation of Sumps 1, 2, and 3 along with the sealing of building slab cracks located in 2 and 4 Foster Avenue and 3 United States Avenue. The automated telemetric methane monitoring sensor at Sump 1 had detected elevated levels of methane. This methane intrusion appeared to be exacerbated during rain events, likely due to rainwater displacing soil gas from pore space. Sumps 2 and 3 were considered to have potential as methane intrusion points, although no elevated levels had been detected within these sumps.

Sumps 1 and 2 are constructed using commercially available plastic round sump liners with solid bottoms and perforated sides. Sump 3 was a rectangular excavated area cut through the floor slab, constructed with plastic sheet lining the sides and an open bottom. During initial sump investigations, a 5-gallon bucket with perforations was installed at Sump 3 so the methane sensor could be mounted to effectively monitor methane levels at this location.

A French drain extends 101 feet from Sump 1, parallel to the northeast wall of 2 Foster Avenue towards 3 United States Avenue. The drain terminates at a fire wall about 30 feet into the 3 United States Avenue raised floor or crawl space. The continuous methane monitoring completed between March 2016 until the implementation of the sump venting

work plan (June 2016) demonstrated the French drain was serving as a collection trench, or pathway for methane. This drain arrangement is located on the up gradient side of 2 Foster Avenue with respect to groundwater flow. When rain raises groundwater levels and displaces gases in the upper layers of soil, soil gas is forced out into Sump 1. Elevated ambient temperatures, dropping barometric pressures, and warehouse exhaust fans also seem to correlate with elevated methane levels in Sump 1. Figure 1 depicts sump locations and building layout.

2 SUMP DEPRESSURIZATION AND VENTING

2.1 DEVIATIONS FROM THE WORK PLAN

Sherwin-Williams submitted the Work Plan to the EPA on March 23, 2016. EPA provided comments to the Work Plan on March 30, 2016 and subsequent revisions were submitted to the EPA on April 8, 2016. EPA held discussions with Sherwin-Williams and verbally approved the installation of a passive sump venting system. Between June 9 and June 13, 2016, the revised Work Plan was completed; however, deviations from the plan were implemented as discussed below:

- Sensepoint XCD Lower Explosive Limit (LEL) sensors originally installed in Sumps 1, 2, and 3 were proposed for relocation to ceiling height in the Work Plan. However, due to health and safety issues associated with working at elevated heights and the associated complications with maintaining and calibrating the LEL sensors, the former in-sump sensors were relocated to 8 feet above the building slab immediately above the corresponding sumps.
- EPA approved a passive sump venting system for installation in place of the requested active venting system proposed in the Work Plan; therefore, a passive system was installed.
- A temporary LEL, oxygen, and air velocity monitoring station was installed on the roof with sensors in the Sump 1 passive vent stack per the request of EPA. This temporary monitoring station will be used to evaluate the performance of the passive venting system.
- A cracks and slab expansion joint gaps associated with a French drain located along the exterior wall near Sump 1 were to be sealed during the sump venting event. The cracks and expansion gaps extend from Sump 1 located in 2 Foster Avenue to the 3 United Stated Avenue crawls space. A heating, ventilation, and air-conditioning (HVAC) unit condensate line drains into a portion of the crack located under 3 United States Avenue and will need to be relocated at a later date. A small portion of the crack could not be sealed due to the presence of the drain line and will be sealed once the drain line is relocated by Brandywine.

2.2 SUMP DEPRESSURIZATION AND VENTING SYSTEM INSTALLATION

Sump depressurization and venting activities were completed between June 9 and June 13, 2016. All work was completed between the agreed upon hours of 8 a.m. and 4 p.m. to accommodate the schedule of the tenant, Harbor Linen. Sump venting activities were completed in accordance with the approved Work Plan except as detailed in Section 2.1.

As-Built details of the passive sump ventilation system are located in Exhibit 1. Weston Solutions, Inc. (Weston) performed oversight during system installation, and photo documentation of installation activities are located in Attachment 1. The following summarizes completed activities:

June 9, 2016

Clean Vapors completed installation of Sump 1 sealing and venting system. The temporary sump located at Sump 3 was removed and replaced by a commercially available plastic sump liner similar to Sumps 1 and 2. Holes were drilled into the bottom of Sump 3 to allow water collected in the sump to drain to the subsurface. The area surrounding the sump was leveled and sealed with concrete.

June 10, 2016

Clean Vapors completed installation of Sump 2 sealing and venting system. Approximately 101 feet of cracking and slab gaps associated with a French drain located along the exterior wall near Sump 1 were sealed using a polyurethane caulking (Vulkem 911). A 2-inch portion of the crack located under 3 United States Avenue could not be sealed during this mobilization as discussed in Section 2.1. Electrical subcontractor, Mechanical Solutions Associates (MSA), relocated Sensepoint XCD LEL sensors 1, 2, and 3 to 8-feet immediately above each sump. Weston completed calibration of the sensors in accordance with the manufactures recommendations using 50% methane and 20.9% oxygen balance nitrogen (Northside Sales, Co. Lot CAQ-135S-2.5-7, expiration date February 25, 2020).

Weston installed the temporary monitoring equipment on the roof of 2 Foster Avenue at the Sump 1 vent stack. A MultiRae Plus capable of monitoring LEL and oxygen, along with a TSI Model 8475 Air Velocity Transducer, were installed into the vent stack of Sump 1. A datalogger and cellular modem transmit monitoring data to a cloud archive. The datalogger and modem are powered by a 12-volt marine battery recharged with solar panels.

June 13, 2016

Clean Vapors completed installation of Sump 3 sealing and passive venting system. Additional cracks observed around Sump 1 and 2 were sealed. Jottan Roofing, retained by Clean Vapors at the request of Brandywine, completed the three roof penetrations associated with the passive sump vents. Metal flashing was installed around the vent stacks and liquid roofing adhesive was placed in and around each flashing.

2.3 HEALTH AND SAFETY

Prior to work, the head space in each sump and the breathing zone around the sumps were monitored for oxygen and LEL levels using a Q-Rae. Continuous monitoring was conducted during all sump venting and crack sealing activities. No elevated LEL readings were observed during installation activities.

3 QUALITY ASSURANCE PROJECT PLAN

All work was completed in accordance with applicable building codes and in accordance with manufacturer's specifications and operating and maintenance instructions. Weston provided oversight during all phases of work and photo-documented all activities (see Attachment 1). Weston verified that all materials (i.e., PVC pipes, sealants, and caulk) used on site were approved in the Work Plan.

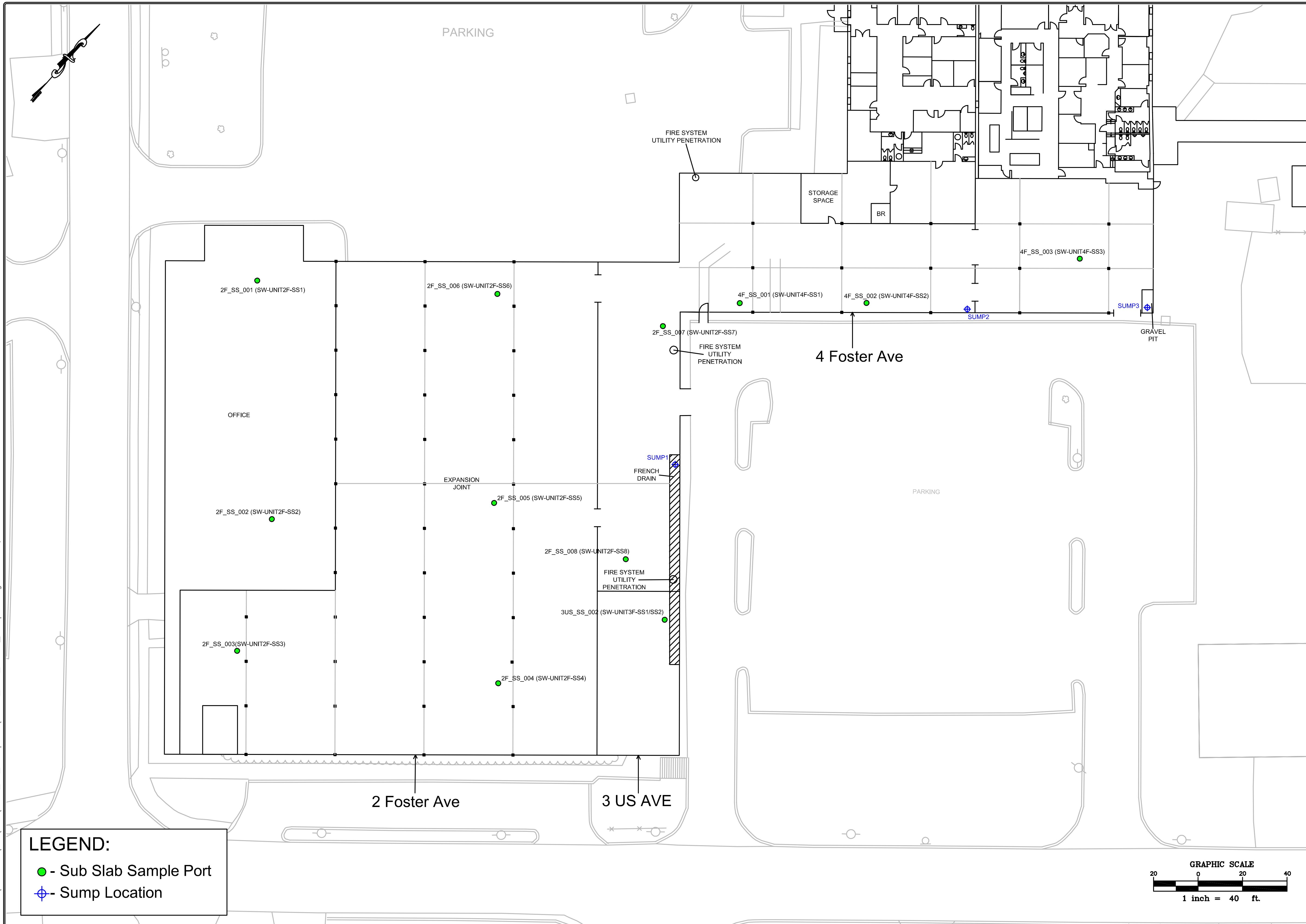
4 SYSTEM PERFORMANCE MONITORING

4.1 SUMP #1 VENT STACK MONITORING

Between March 2016 and June 2016, Sensepoint XCD LEL sensors placed in Sumps 1, 2, and 3, have been continuously monitored for elevated LEL conditions. Elevated LEL readings have been regularly identified in Sump 1, typically associated with warm days or precipitation events. To evaluate the effectiveness of the passive sump venting system, a temporary LEL monitoring station was installed in the vent stack of Sump 1 as requested by EPA. This monitoring station includes a MultiRae Plus capable of monitoring LEL and oxygen and a TSI Air Velocity probe. Data is continuously logged and uploaded to a cloud-based database (www.ienvironet.com). Text alerts for LEL readings above 10% were established and distributed to EPA and the Sherwin-Williams monitoring team, in accordance with the Methane Monitoring Program (March 2016).

Data collected will be used to evaluate the performance of the passive venting system. Results and conclusions of the temporary performance monitoring for the sump venting system will be provided under separate cover.

FIGURES



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WESTON SOLUTIONS

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CONTRACT No.:
DELIVERY ORDER NO.:
DRAWN/MODIFIED BY: S. Poultney
DATE CREATED: 3/4/2016
REPORT DATE: July 2016
DRAWING PATH: see footer
REVISION No.: 0
WORK ORDER No.: 20076.022.084.0003

SHERWIN WILLIAMS

CLIENT NAME: Sherwin-Williams Company
PROJECT NAME: Former Manufacturing Plant (FMP) Vapor Intrusion
DRAWING TITLE: 2 AND 4 FOSTER AVE AND 3 US AVE FLOOR PLAN
DATE: 7/15/2016
SCALE: 1"=40'
FIGURE: 1

ATTACHMENT 1

PHOTO LOG
SUMP VENTING INSTALLATION ACTIVITIES
JUNE 9TH THROUGH JUNE 13TH

PHOTOGRAPH LOG

Project Name:	Date:	Site Location:	Project No.
Sherwin Williams FMP-VI	6/9/2016 to 6/13/2016	Gibbsboro, NJ 2, 4 Foster Avenue and 3 United States Avenue	20076.022.084.0003

Photo No. 1	Sump 1 sealed and vent stack

Photo No. 2	Sump 1 vent stack and new LEL sensor location.

PHOTOGRAPH LOG

Project Name:	Date:	Site Location:	Project No.
Sherwin Williams FMP-VI	6/9/2016 to 6/13/2016	Gibbsboro, NJ 2, 4 Foster Avenue and 3 United States Avenue	20076.022.084.0003

Photo No. 3	Sump 2 sealed, vent stack and new LEL sensor location.

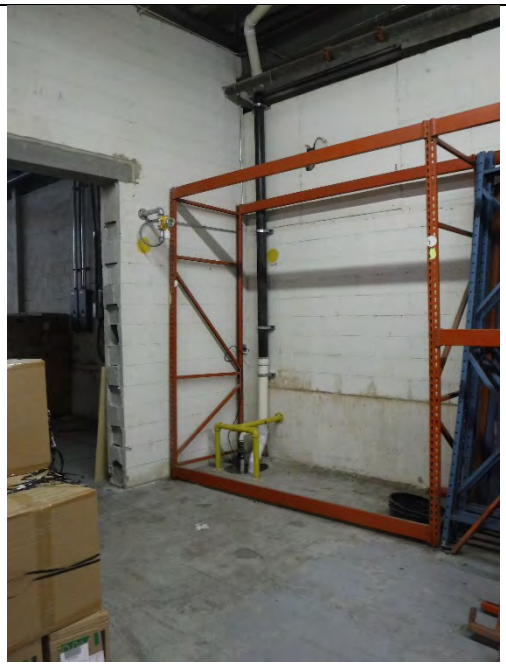


Photo No. 4	Sump 3 floor repair.

PHOTOGRAPH LOG

Project Name:	Date:	Site Location:	Project No.
Sherwin Williams FMP-VI	6/9/2016 to 6/13/2016	Gibbsboro, NJ 2, 4 Foster Avenue and 3 United States Avenue	20076.022.084.0003

Photo No.	
5	Sump 3 sump sealed and vent stack.

Photo No.	
6	Sump 3 vent stack and new LEL sensor location.

PHOTOGRAPH LOG

Project Name:	Date:	Site Location:	Project No.
Sherwin Williams FMP-VI	6/9/2016 to 6/13/2016	Gibbsboro, NJ 2, 4 Foster Avenue and 3 United States Avenue	20076.022.084.0003

Photo No.	
7	Typical roof vent stack penetration repair.

Photo No.	
8	Sump 1 floor crack repairs (2 Foster Ave.)

PHOTOGRAPH LOG

Project Name:	Date:	Site Location:	Project No.
Sherwin Williams FMP-VI	6/9/2016 to 6/13/2016	Gibbsboro, NJ 2, 4 Foster Avenue and 3 United States Avenue	20076.022.084.0003

Photo No. 9	Floor crack repairs in 3 United States Ave crawlspace.

Photo No. 10	Hole in slab near HVAC unit in 3 United States Ave crawlspace.

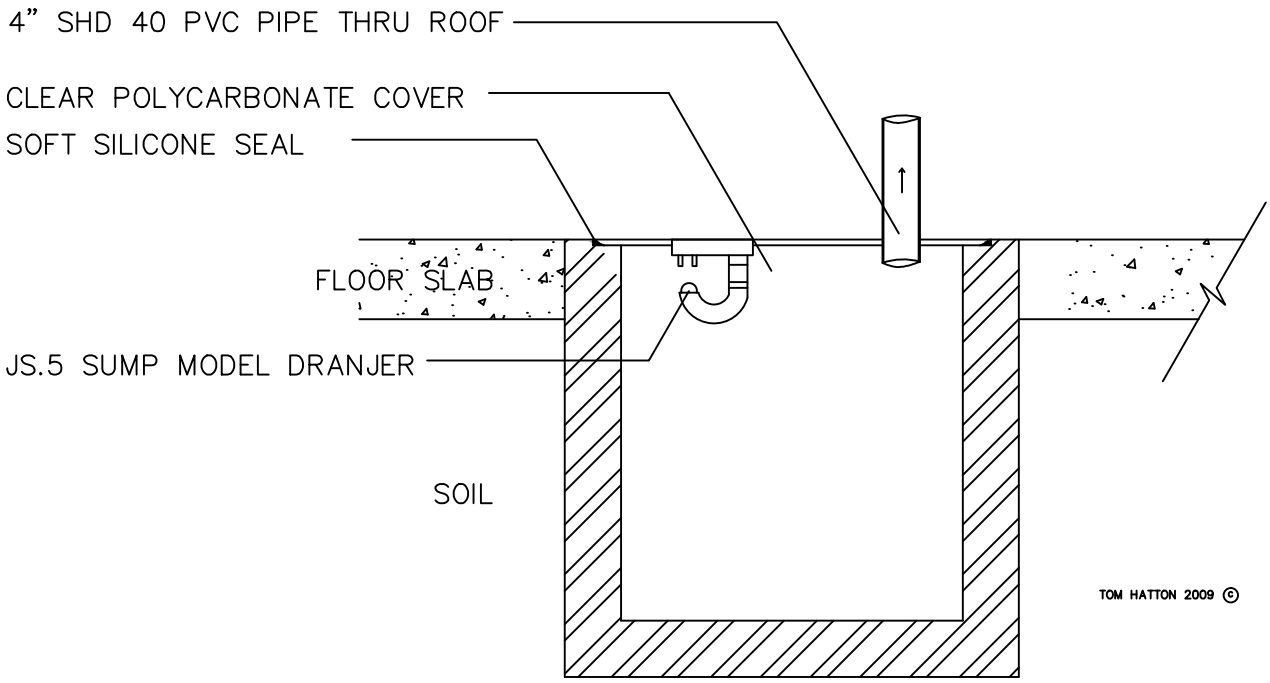
PHOTOGRAPH LOG

Project Name:	Date:	Site Location:	Project No.
Sherwin Williams FMP-VI	6/9/2016 to 6/13/2016	Gibbsboro, NJ 2, 4 Foster Avenue and 3 United States Avenue	20076.022.084.0003

Photo No.	
11	Sump 1 vent stack temporary monitoring equipment.

EXHIBITS

SUMP SEAL DETAIL



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